

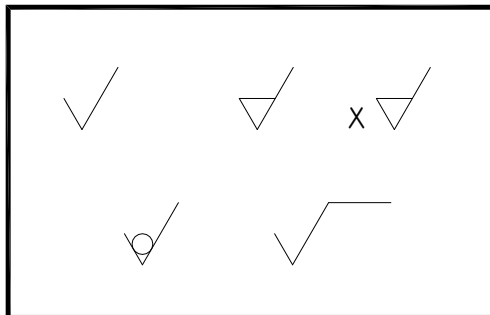
**TERMS TO BE DEFINED OR IDENTIFIED for COMPETENCY 13:**

- Finish marks
- Weld symbols
- Thread terms
  - Form
  - Crest
  - Root
  - Lead
- Fasteners
  - Key
  - Lead
  - Retaining ring
- American National Thread
- ANSI Y14.6-2001
- Automatic welding
- Arc welding
- NPS
- Unified Thread Form
  - Thread degree
- Butress thread form
  - Thread degree
- Whitworth thread form
  - Thread degree
- Sharp-V thread form
- Piping isometric
- Types of welds
  - Tensile
  - Compression
  - Bending
  - Torsion
  - Weld angles
- TIG welding
- MIG welding
- Shielded metal arc welding

**ITEMS FOR REVIEW for COMPETENCY 13:**

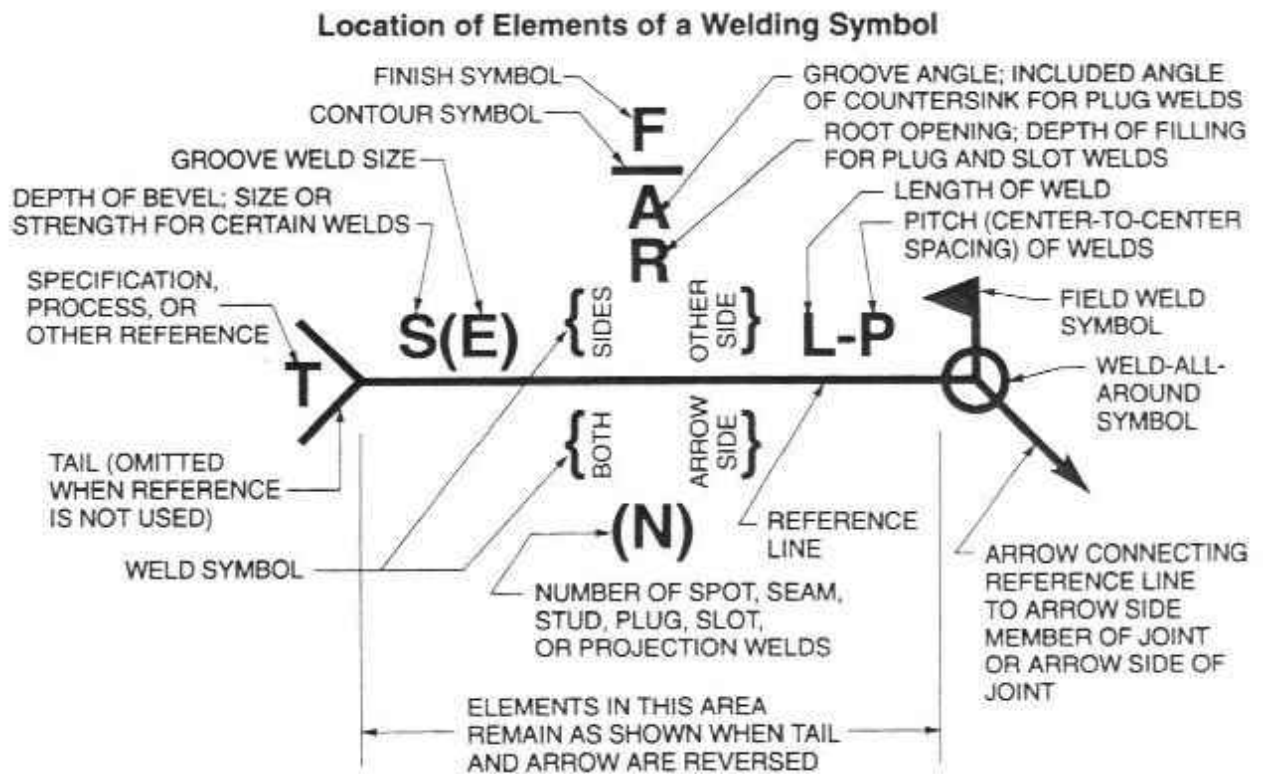
- **Threaded Fasteners Terminology**
  - **Form** – Profile of a thread, such as simplified, detailed or schematic. Simplified form is industry preferred and quickest to execute.
  - **Crest** – The edge or surface that joins the side of a thread and is furthest from the cylinder or cone; the outside point of a thread.
  - **Root** – The edge or surface the joins the side of adjacent thread forms and coincides with the cylinder or cone; the inside meeting point of a thread.
  - **Pitch** – The distance between corresponding points on adjacent thread forms measured parallel to the axis; distance between thread points.
  - **Lead** - The distance a thread part moves axially; one complete revolution of a thread.
- **Other Fasteners Terminology**
  - **Key** – Piece of metal placed so that part of it lies in a groove cut in a shaft, but fitting into a groove cut into a mating hub. Creating restrictive movement between mating parts.
  - **Rivet** – Used as a permanent fastener, generally between pieces of sheet or rolled metal.
  - **Spring** – A coiled elastic body designed to store energy when deflected.

- **Retaining Ring** – designed to prevent axial movement of a shaft in a hub; generally a ring is placed around shaft to restrict movement within the mating part (hub).
- **Finish Marks**
  - Surface finish relates to the waviness, roughness, lay and flaws of a parts surface.
  - Surface finish refers to the smoothness of the finished surface created by machining, honing, grinding or lapping.
  - Finish marks should be placed on the edge view of finished surfaces.
  - For parts finished all over, marks may be omitted and covered with a general note.
  - Finish marks are left off rolled stock, plate, sheet or other raw materials not machined in the manufacturing process.

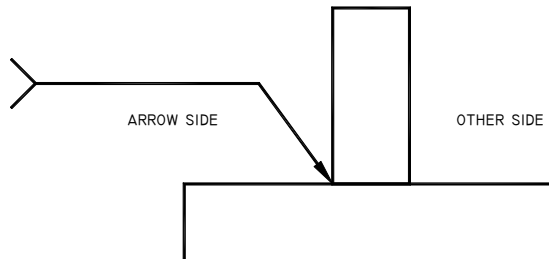
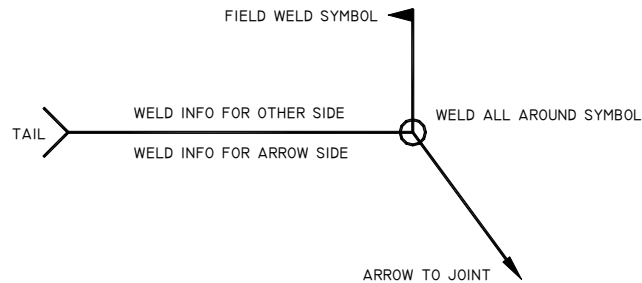


### Basic welding types and symbols

- Location and meaning of welding symbols

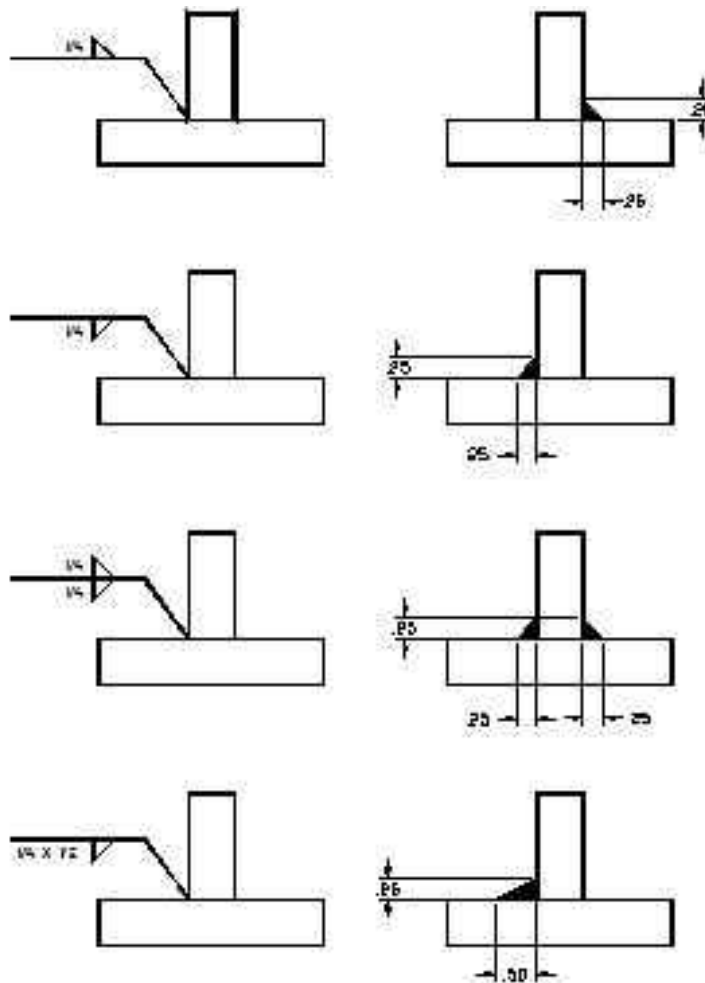


- American Welding Society regulates welding symbol specifications.
- Identify basic weld type symbols.



## Fillet Welds

A fillet weld is used to make lap joints, corner joints, and T joints. The fillet weld is roughly triangular in cross-section, although its shape is not always a right triangle or an isosceles triangle.

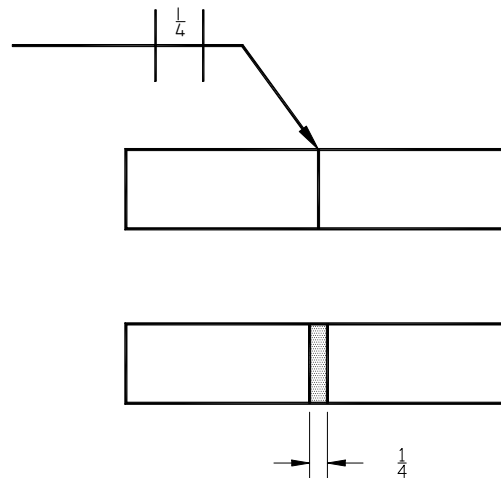


## Groove Welds

The groove weld is used to make edge-to-edge joints, although it is also often used in corner joints, T joints, and joints between curved and flat pieces. There are many ways to make a groove weld, the differences depending primarily on the geometry of the parts to be joined and the preparation of their edges.

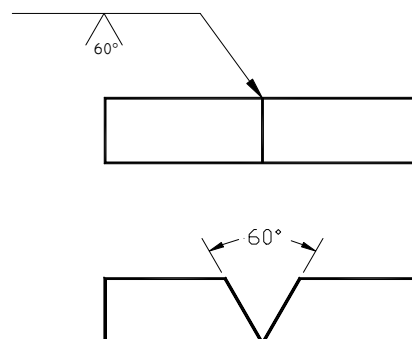
- **Square Groove Weld**

The groove is created by either a tight fit or a slight separation of the part edges. The amount of separation, if any, is given on the weld symbol.



- **V-Groove Weld**

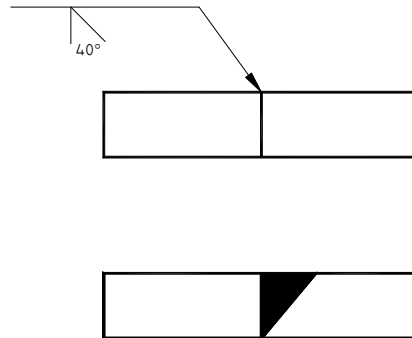
The edges of both pieces are chamfered, either singly or doubly, to create the groove. The angle of the V is given on the weld symbol.



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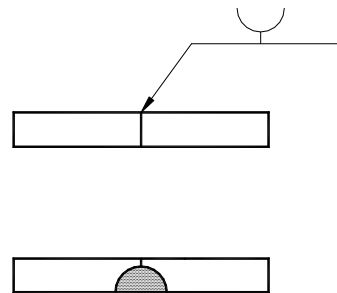
- **Bevel Groove**

The edge of one of the pieces is chamfered and the other is left square. The bevel symbol's perpendicular line is always drawn on the left side, regardless of the orientation of the weld itself.



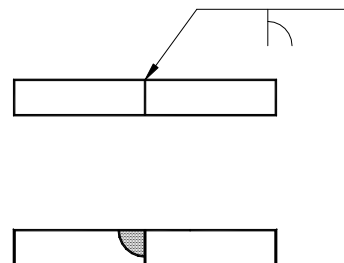
- **U-Groove Weld**

The **U-groove** weld, in which the edges of both pieces are given a concave treatment.



- **J-Groove Weld**

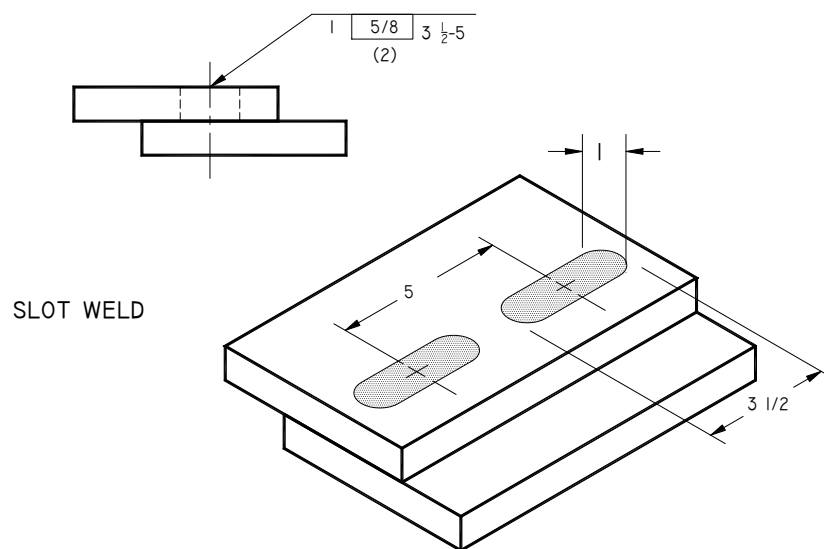
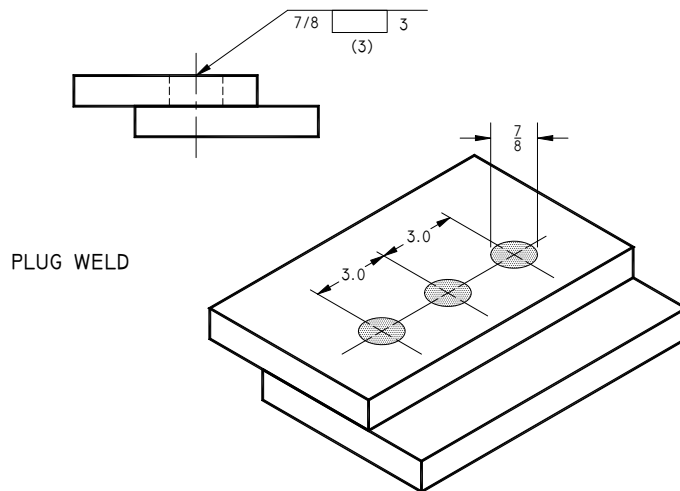
The **J-groove** weld, in which the edge of one of the pieces is given a concave treatment and the other is left square. As with the bevel groove weld, the perpendicular line is always drawn on the left side and the arrow points to the piece that receives the edge treatment.



## Other Welds

- **Plug or Slot Weld**

Plug welds and slot welds are used join overlapping members, one of which has holes (round for plug welds, elongated for slot welds) in it. Weld metal is deposited in the holes and penetrates and fuses with the base metal of the two members to form the joint.

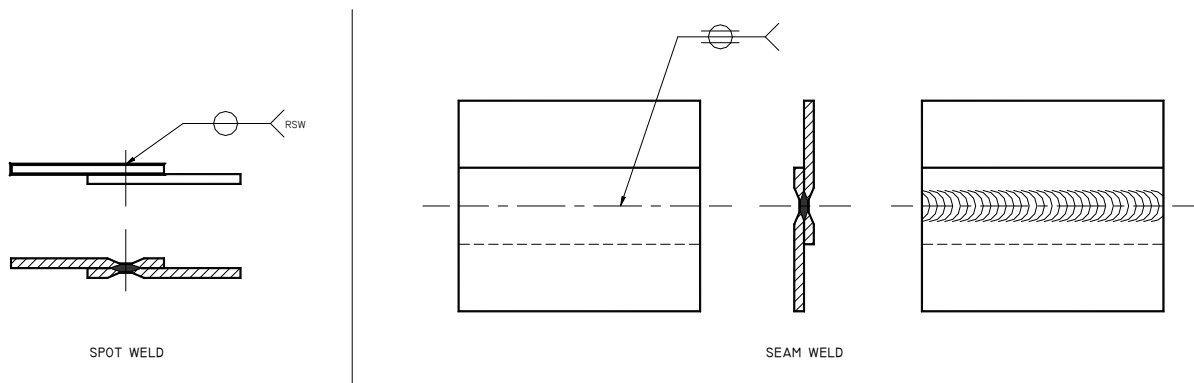




## Resistance welding

- **Spot Weld**

Spot welding is the most commonly used type of resistance welding. The material to be joined is placed between two electrodes and pressure is applied. A charge of electricity is then sent from one electrode through the material to the other electrode. Spot welding is especially useful in fabricating sheet metal parts.

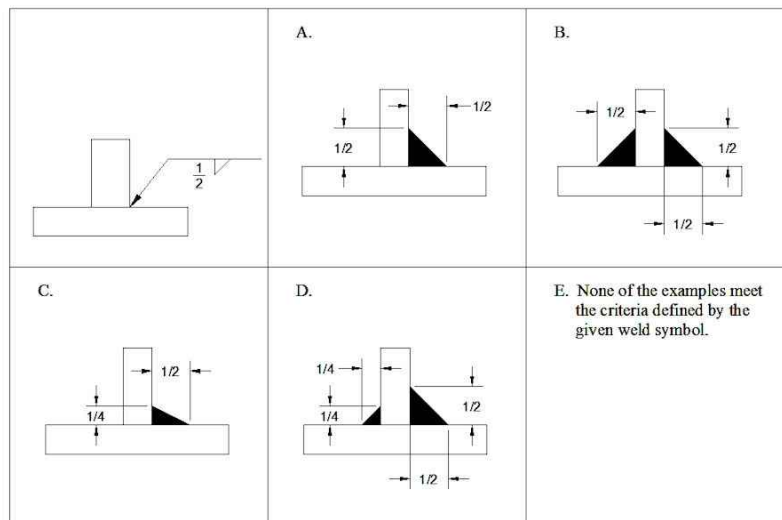


- **Seam Welding**

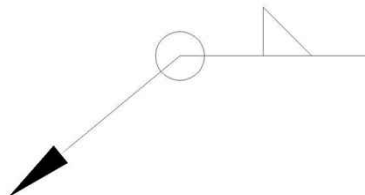
Seam welding is like spot welding except that the spots overlap each other, making a continuous weld seam. In this process, the metal pieces pass between roller electrodes. As the electrodes revolve, the current is automatically turned off and on at the speed at which the parts are set to move.

**SAMPLE REVIEW QUESTIONS**

1. Complete the sentence: "A surface weld ....."  
Is used to build up a surface.  
Is part of a lap weld.  
Is denoted by a symbol with other side significance.  
Has reference to a specific joint.
2. The usual fillet weld has equal legs.  
True  
False
3. Select the correct graphical representation of the weld shown.  
A  
B  
C  
D  
E



4. Identify the weld symbol.  
Weld all around  
Groove  
Spot  
Plug  
Field



5. There are how many different methods of representing screw threads that can be on a drawing?

- 3
- 4
- 2
- 5

6. In the case of blind tapped holes, drill depth is normally drawn at least 3 schematic pitches beyond the thread length.

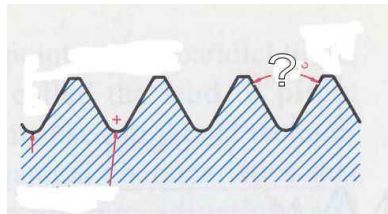
- True
- False

7. The American National Standard for pipe threads was formulated by Robert Briggs in what year:

- 1882
- 1890
- 1901
- 1923

8. What is the degree of the Unified Thread Form?

- 60°
- 65°
- 50°
- 40°



9. What kind of pipe is the preferred above-ground pipe used in industry today?

- Steel
- Iron
- PVC
- Titanium

10. Identify the element of the weld symbol indicated by the letter "F."

- Finish symbol
- Process symbol
- Number of welds
- Root opening or depth of filling

